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25096 7590 01/06/2010

PERKINS COIE LLP
PATENT-SEA
P.O. BOX 1247
SEATTLE, WA 98111-1247

EXAMINER

HAN, SHENG

ART UNIT

PAPER NUMBER

1793

DATE MAILED: 01/06/2010

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/547,445

06/08/2006

Arun Wagh

166538025US1

1664

TITLE OF INVENTION: METHOD OF WASTE STABILIZATION WITH DEWATERED CHEMICALLY BONDED PHOSPHATE CERAMICS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	04/06/2010

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

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**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
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INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

25096 7590 01/06/2010

**PERKINS COIE LLP
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Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/547,445 06/08/2006 Arun Wagh 166538025US1 1664

TITLE OF INVENTION: METHOD OF WASTE STABILIZATION WITH DEWATERED CHEMICALLY BONDED PHOSPHATE CERAMICS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	04/06/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
HAN, SHENG	1793	588-300000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
- (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____
- 3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies _____

4b. Payment of Fee(s); (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/547,445	06/08/2006	Arun Wagh	166538025US1	1664
25096	7590	01/06/2010	EXAMINER	
PERKINS COIE LLP PATENT-SEA P.O. BOX 1247 SEATTLE, WA 98111-1247			HAN, SHENG	
			ART UNIT	PAPER NUMBER
			1793	
DATE MAILED: 01/06/2010				

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 306 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 306 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Notice of Allowability	Application No.	Applicant(s)	
	10/547,445	WAGH ET AL.	
	Examiner	Art Unit	
	SHENG HAN	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 9/23/09.
2. ☒ The allowed claim(s) is/are 1, 5, 8, 9, 13, 16-18, 22, 24, 38-51 and 54-58.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
 - * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

REASONS FOR ALLOWANCE

The following is an examiner's statement of reasons for allowance:

The Application uses heat to drive off bound water from the stabilized radioactive waste after it has been bound with a phosphate material to form a ceramic. Although it has been taught that the use of phosphate ceramics can stabilize a radioactive waste material comprising a magnesium oxide binder and that water can be removed from the waste while it is in the solid state, it has not been taught that the two could occur in the same process. Nor is the combination of the two apparent. Although water is likely driven out of the stabilization later on in the process since radioactive waste becomes warmer with time, this newly amended claim is limited to water is removed right after the waste is solidified as part of a process step. Since water is typically driven out by the heat of the waste itself over time, it would not be obvious to drive the water out during the stabilization step.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

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Authorization for this examiner's amendment was given in a telephone interview with Kerith Kanaber on 11/9/09.

The application has been amended as follows:

Claim 1:

A method of stabilizing a radioactive waste in chemically bonded phosphate ceramic comprising:

preparing a slurry comprising the radioactive waste, water, an oxide binder and a phosphate binder, wherein the oxide binder is MgO;

allowing the slurry to cure to a solid hydrated chemically bonded phosphate ceramic matrix; and

removing bound water from the solid hydrated chemically bonded phosphate ceramic matrix, wherein the hydrated ceramic matrix is heated to a select temperature between a lower first temperature where the bound water begins to be driven from the hydrated ceramic matrix and a higher second temperature where non-water components of the hydrated ceramic matrix are volatilized.

Claim 2: cancelled

Claim 3: cancelled

Claim 4: cancelled

Claim 5: The method of claim 1 wherein the waste and the water have been mixed prior to the preparation of the slurry and further comprising removing a select amount of water from the waste and water mixture prior to preparation of the slurry.

Claim 6: cancelled

Claim 7: cancelled

Claim 8: The method of claim 1 further comprising removing water from the slurry while mixing the slurry or allowing the slurry to cure.

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Claim 9: The method of claim 8 wherein the water is removed from the slurry through evaporation by heating, and wherein the slurry is heated to a select curing temperature between a first curing temperature where water is removed from the slurry as it cures and a second curing temperature where non-water components of the slurry are volatilized.

Claim 10: cancelled

Claim 11: cancelled

Claim 12: cancelled

Claim 13: The method of claim 1 further comprising adding a select amount of a reducing agent or an oxidizing agent to the waste or the slurry prior to allowing the slurry to cure.

Claim 14: cancelled

Claim 15: cancelled

Claim 16: A method of stabilizing a radioactive waste in chemically bonded phosphate ceramic comprising:

providing a mixture of the radioactive waste and water;

removing a select amount of water from the waste and water mixture to form a residual waste and water mixture;

preparing a slurry comprising the residual waste and water mixture, an oxide binder and a phosphate binder wherein the oxide binder is MgO ;

allowing the slurry to cure to a solid chemically bonded phosphate ceramic matrix, wherein the solid chemically bonded phosphate ceramic matrix comprises bound water molecules; and

removing the bound water molecules from the solid chemically bonded phosphate ceramic matrix by heating.

Claim 17: The method of claim 16 wherein the select amount of water is removed from the waste and water mixture through evaporation by heating.

Claim 18: The method of claim 16 wherein the quantity of water removed from the waste and water mixture is selected to result in a solids content within the waste and water mixture, after the removal step, of equal to or less than 90% measured by weight of the residual waste and water mixture.

Claim 19: cancelled

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2Claim 20: cancelled

Claim 21: cancelled

Claim 22: method of claim 16 wherein the phosphate binder is KH.sub.2PO.sub.4 .

Claim 23: cancelled

Claim 24: The method of claim 16 further comprising adding a select amount of a reducing agent or an oxidizing agent to the waste or the slurry prior to allowing the slurry to cure.

Claim 25: cancelled

Claim 26: cancelled

Claim 27: cancelled

Claim 28: cancelled

Claim 29: cancelled

Claim 30: cancelled

Claim 31: cancelled

Claim 32: cancelled

Claim 33: cancelled

Claim 34: cancelled

Claim 35: cancelled

Claim 36: cancelled

Claim 37: cancelled

Claim 38: The method of claim 1 wherein the waste has a first pH level, and further comprising adding a neutralizing material to the waste before allowing the slurry to cure to at least partially neutralize the waste so the waste has a second pH level different from the first pH level.

Claim 39: The method of claim 1, further comprising adding a beta-absorptive, gamma-absorptive, alpha-absorptive, or neutron-absorptive material directly to the waste before allowing the mixed slurry to cure.

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Claim 40: The method of claim 1, further comprising dewatering the waste during or before the waste is combined with the oxide binder and the phosphate binder.

Claim 41: The method of claim 1, further comprising adding a neutralizing material to the waste to at least partially neutralize the waste before the waste is combined with the oxide binder and the phosphate binder.

Claim 42: The method of claim 1 further comprising at least partially de-watering the waste before allowing the slurry to cure.

Claim 43: The method of claim 1, further comprising adding an H.sub.2 getter agent to the waste or the slurry to reduce H.sub.2 gas generation.

Claim 44: The method of claim 1 wherein the waste is an acidic waste, further comprising neutralizing the waste with at least one metal oxide.

Claim 45: The method of claim 1 wherein the waste is a basic waste, having a pH level further comprising reducing the pH level by adding a neutralizing agent.

Claim 46: The method of claim 1, further comprising adding a salt to the slurry to control reaction rates during mixing of the slurry.

Claim 47: The method of claim 1, further comprising adding a stabilizing agent or a reducing agent to the waste or the slurry to decrease solubility of constituents of the waste.

Claim 48: The method of claim 1, further comprising adding an exothermic agent to the waste or the slurry that reacts and heats the waste or the slurry.

Claim 49: The method of claim 1, further comprising adding to the waste or the slurry a shielding agent for neutrons, alpha particles, beta particles, or gamma particles in the waste to provide an at least partially self-shielding waste.

Claim 50: The method of claim 1 wherein the hydrated ceramic matrix is in a vacuum chamber and the bound water is removed from the hydrated ceramic matrix by reducing a chamber pressure.

Claim 51: The method of claim 1 wherein the lower first temperature is approximately 100°C and the higher second temperature is approximately 200°C.

Claim 52: Cancelled

Claim 53: Cancelled

Claim 54: A method of stabilizing a radioactive waste in chemically bonded phosphate ceramic comprising:

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preparing a slurry comprising radioactive waste, an oxide binder and a phosphate binder, wherein the oxide binder is MgO;

removing a select amount of water from the slurry while mixing the slurry or allowing the slurry to cure;

allowing the slurry to cure to a solid chemically bonded phosphate ceramic matrix; and

driving off bound water from the solid chemically bonded phosphate ceramic matrix to form a solid matrix having reduced weight wherein driving off bound water from the solid chemically bonded phosphate ceramic matrix includes heating the solid chemically bonded phosphate ceramic matrix to a select temperature between a first temperature where the bound water begins to be driven off from the solid chemically bonded phosphate ceramic matrix and a higher second temperature where non-water components of the solid chemically bonded phosphate ceramic matrix are volatilized.

Claim 55: The method of claim 54 wherein removing the select amount of water from the slurry includes heating the slurry to a temperature greater than approximately 100°C, and wherein the first temperature for removing bound water from the solid chemically bonded phosphate ceramic matrix is approximately 100°C and the second temperature for removing bound water from the solid chemically bonded phosphate ceramic matrix is approximately 200°C.

Claim 56: The method of claim 54 wherein the waste comprises a liquid waste.

Claim 57: A method of stabilizing a radioactive waste in chemically bonded phosphate ceramic comprising:

providing a mixture of the radioactive waste and water;

removing a select amount of water from the waste and water mixture to form a residual waste and water mixture;

preparing a slurry comprising the residual waste and water mixture, an oxide binder and a phosphate binder, wherein the oxide binder is MgO;

allowing the slurry to cure to a solid chemically bonded phosphate ceramic matrix; and

removing bound water from the solid chemically bonded phosphate ceramic matrix, wherein removing bound water from the solid chemically bonded phosphate ceramic matrix includes heating the solid chemically bonded phosphate ceramic matrix to a select temperature between a first temperature where the bound water begins to be removed from the solid chemically bonded phosphate ceramic matrix and a higher

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second temperature where non-water components of the solid chemically bonded phosphate ceramic matrix are volatilized.

Claim 58: The method of claim 57 wherein removing the select amount of water from the waste and water mixture includes heating the waste and water mixture to a temperature greater than approximately 100°C, and wherein first temperature for removing bound water from the solid chemically bonded phosphate ceramic matrix is ~~between~~ approximately 100°C and the second temperature for removing bound water from the solid chemically bonded phosphate ceramic matrix is approximately 200°C.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SHENG HAN whose telephone number is (571)270-5823. The examiner can normally be reached on Monday-Thursday, 8:00-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Melvin Curtis Mayes can be reached on 571-272-1234. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

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Sheng Han
Examiner
Art Unit 1793

SH

December 16, 2009

/Melvin Curtis Mayes/
Supervisory Patent Examiner, Art Unit 1793